

# Anatomic Landmarks in the Sleeve Gastrectomy

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## ABSTRACT

**Background and Objectives:** The vertical sleeve gastrectomy is a common bariatric procedure. The operation is relatively standard, but there are still variations among surgeons. The two main variations are bougie size and extent of distal resection. Some surgeons will start the gastric resection at 2 cm proximal to the pylorus, whereas others start at 6 cm. Our hypothesis is that there are anatomic landmarks that are constant and can be used to help standardize the procedure.

**Methods:** Twenty-eight morbidly obese patients undergoing laparoscopic bariatric surgery (gastric bypass or sleeve gastrectomy) had the distance from the pylorus to the second branch of the right gastroepiploic artery on the inferior border of the greater curvature of the stomach measured. Body mass index, height, weight, age, and sex were also analyzed.

**Results:** The study comprised 22 women and 6 men with a mean age of 46.2 years (range, 22–68 years). The mean body mass index was 43.2 kg/m<sup>2</sup> (range, 37.2–62.4 kg/m<sup>2</sup>). The mean distance from the pylorus to the second branch of the right gastroepiploic vessel was 4.52 cm (range, 3.5–5.5 cm).

**Conclusion:** The second branch of the right gastroepiploic artery can be used as a constant anatomic landmark. It is found about 4.5 cm from the pylorus. This can be safely used as a landmark for marking the distal extent of resection during a vertical sleeve gastrectomy and obviates the need to formally measure the distance from the pylorus.

**Key Words:** Bariatric surgery, Sleeve gastrectomy, Surgical anatomy

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## INTRODUCTION

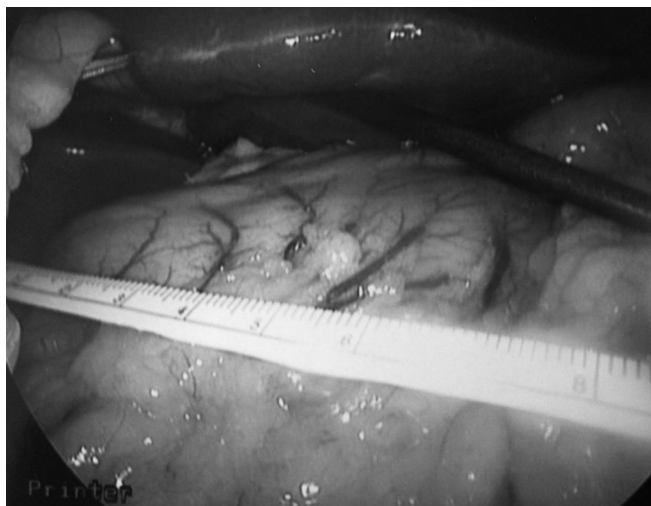
The laparoscopic vertical sleeve gastrectomy (LSG) is quickly becoming a preferred bariatric operation. It is supplanting the lap band and is widely performed now worldwide. It is a restrictive operation that leads to a 50% to 75% extra body weight loss and a resolution of medical comorbidities similar to the laparoscopic Roux-en-Y gastric bypass.<sup>1,2</sup>

The technique of performing the LSG is not consistent among bariatric surgeons. The common steps are as follows: evaluation for the presence of a hiatal hernia and repair, if present; mobilization of the greater curvature of the stomach by division of the short gastric vessels; placement of an intragastric bougie (or some other device to size the sleeve); a stapled vertical gastrectomy, usually starting 2 to 5 cm proximal to the pylorus; and lastly, removal of the specimen.<sup>3</sup> The steps with the most surgeon-to-surgeon variability are determining the size of the bougie used to create the sleeve and determining the distance proximal from the pylorus from which the resection is started.

Most surgeons start the vertical resection by measuring the distance proximal from the pylorus and firing the first staple load a standard distance from it. Surgeons may elect to start stapling by using a measuring device such as a ruler, a length of suture, or an instrument with a known length, such as a laparoscopic grasper. The hypothesis of our study was that there may be an anatomic landmark available to guide surgeons as they measure the distance from the pylorus.

## METHODS

This is a prospective anatomic survey of morbidly obese patients who underwent an LSG or laparoscopic Roux-en-Y gastric bypass. The study was conducted over a 2-month period in 2011. The distance from the pylorus, proximal to the branches of the right gastroepiploic artery, was measured in patients who underwent bariatric surgery (**Figure 1**). This was performed by placing a ruler intra-abdominally and using palpation and visualization to determine where the pylorus was located. The ruler was placed flush with the inferior border of the stomach. The second branch of the right gastroepiploic vessel was used as the endpoint for measurement. This distance was recorded in centimeters for 3 separate measurements, and the average was used as the final measurement.



**Figure 1.** Measurement of distance from pylorus to second branch of right gastroepiploic vessel.

There was a 0.01-cm difference in the average distance after the first 19 patients as compared with the last 9 patients, so it was believed that accruing more patients would not greatly change the result. An intraoperative photograph was taken, and an Excel spreadsheet (Microsoft, Redmond, WA, USA) was used for data entry and analysis. Inclusion criteria were patients with a body mass index  $> 35 \text{ kg/m}^2$  and age  $> 18$  years. Exclusion criteria were patients with prior gastric surgery or revisional bariatric surgery. We followed the principles of the Declaration of Helsinki, and all patients had given permission for intraoperative photographs to be taken. All intraoperative photographs were left unmarked with any patient information and were essentially anonymous.

## RESULTS

The study comprised 22 women and 6 men with a mean age of 46.2 years (range, 22–68 years). The mean body mass index was  $43.2 \text{ kg/m}^2$  (range,  $37.2\text{--}62.4 \text{ kg/m}^2$ ). The mean distance from the pylorus to the second branch of the gastroepiploic vessel was 4.52 cm (range, 3.5–5.5 cm). For women, the mean distance was 4.48 cm, and for men, it was 4.58 cm. Seventeen of the patients were Hispanic, and their mean distance from the pylorus to the second branch of the right gastroepiploic artery was 4.53 cm.

## DISCUSSION

The second branch of the right gastroepiploic artery is a relatively constant distance proximal to the pylorus, at 4.52 cm in the patients studied. It is possible that with a larger sample size, this number could change even more, but it is

unlikely that it would become clinically significant. The low number of patients is one of the weaknesses of this study. However, after we compared the first 19 cases with the next 9 cases, there was a difference of 0.01 cm. It is unlikely that adding further patients would change the measurement any more. Another weakness of the study is that we did not include a control group; the distance from the pylorus to the second branch of the right gastroepiploic may be different in normal-weight individuals. This would make no practical difference in this operation because normal-weight individuals do not undergo an LSG for weight loss. There may also be a weakness in the study by the nature of how our measurements were taken (ie, the palpation and visual identification of the pylorus). However, surgery in the human body is inherently inexact, an experienced bariatric surgeon presumably can accurately locate the pylorus, and the likelihood that a difference of 1 to 2 mm could affect the final outcome of an LSG is questionable. The last weakness of the study is that we used a relatively homogeneous group of patients with a high percentage of women. It is conceivable that there may be gender, racial, or even height/weight variations and we did not have a large enough sample size to detect this.

Our results are not meant to change a surgeon's practice or endorse using the second branch of the right gastroepiploic artery as a starting place for the vertical resection. However, because this vessel is relatively constant, it may be used as a visual and anatomic cue for the initial stapler firing.

## CONCLUSION

The second branch of the right gastroepiploic artery can be used as a constant anatomic landmark. It is found about 4.5 cm proximal from the pylorus. This can be safely used as a landmark for marking the distal extent of resection during a vertical sleeve gastrectomy and obviates the need to formally measure the distance from the pylorus.

## References:

1. Deitel M, Gagner M, Erickson A, Ross C. Third international summit: current status of sleeve gastrectomy. *Surg Obes Relat Dis.* 2011;7:749–759.
2. Himpens J, Dapri G, Cadiere G. A prospective randomized study between laparoscopic gastric banding and laparoscopic isolated sleeve gastrectomy: results after 1 and 3 years. *Obes Surg.* 2006;16:1450–1456.
3. Daes J, Jimenez M, Said N, Daza J, Dennis R. Laparoscopic sleeve gastrectomy: symptoms of gastroesophageal reflux can be reduced by changes in surgical technique. *Obes Surg.* 2012;22:1874–1879.